

Surgical Notes from Ancient Tonga

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Introduction

In November of 1806, an English ship, the PORT AU PRINCE, a privateer which was also fitted out for whaling, began taking on water from a large leak. The captain decided to put into Tonga for repair. Captain James Cook had charted these islands some thirty years earlier and had met with a friendly reception, so much so that he called them the Friendly Islands. But soon after the PORT AU PRINCE anchored off the island of Haapai in Tonga, the ship was captured by native warriors. Most of the crew were massacred. By the express wishes of Finau, the local chief, a young lad by the name of William Mariner, fifteen years of age, the captain's clerk, was spared and taken into the chiefs ohana. Tonga in those times had not been significantly influenced by the rare appearance of English or French ships in these islands. The society, culture, and arts were as they had always been. Surgical instruments and dressing were prepared from native materials. There were no metals, no woven articles, and nothing written nor illustrated.

William Mariner resided for 5 years in Tonga, became fully conversant in the Tongan language, and lived solely among the native people. He was picked up by a passing English ship and thereby returned to the British Isles. In London he was befriended by a London physician, Dr. John Martin, who, in 1817, published a detailed account of Mariner's observations of the Tongan society and of his many experiences while living in Tonga.¹

With some editing and revision by the author, PWD,² * the surgical notes, as recalled by William Mariner, are taken from Dr. Martin's publication.

Let the reader judge for himself the skill and competence of the isolated surgeons of Tonga at the beginning of the nineteenth century.

The surgeons

"No native of Tonga undertakes to practise surgery, unless he has been at the Fiji Islands, where constant wars afford great opportunities of becoming skillful; and no native of Tonga would employ a surgeon who had not been thus schooled. Nor would anyone, as I believe, undertake an important surgical operation, unless he feels himself confident in what he is about to perform. It must be said of them, that they are not rash in their opinions. When a surgeon performs an operation, he never fails to obtain a present from the patient or his friends."

Management of Chest Wounds

"*Kauso* is an operation which is performed to allow of the escape of extravasated blood, which has lodged in the cavity of the thorax, in consequence of wounds, or for the extraction of a broken arrow. There are no other instances where they think of performing it. The instruments they use are a piece of bamboo and a splinter of shell; sometimes a probe made of the stem of the coconut leaf. I saw a number of persons on whom the operation had been performed, and who were in perfect health; and two instances of the fact itself I was an eyewitness to. The one I am about to describe was performed upon a Fiji islander, who had received a barbed arrow in the right side, between the fifth and sixth ribs; not in a line directly below the nipple, but about an inch backwards. The arrow had broken off about three inches from the point, under the third row of barbs; and from the rise and fall of the thorax in the act of respiration the whole piece was perfectly concealed from any external view. The barbs



Mr. Mariner in the costume of the Tonga islands.

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and the point were of the same piece with the arrow. They are made thin under each barb, on purpose that they may break. The barbs of this arrow were about a quarter of an inch transverse diameter, and the stem of the arrow under each row of barbs about the eighth of an inch."

"A countryman of the wounded man wished to perform the operation, but the patient desired that a friend of his, a native of Vavau, should manage it. This proved that he placed at least equal confidence in his skill as in that of his countryman; for he had seen him perform the operation several times before at the Fiji Islands."

The patient was now lying on his back, but a little inclined to his left side; and this was considered a favourable posture for the operation. It was a fine clear day, and the weather warm.

"Had it been rainy or cloudy, or had the patient felt himself cold, fires would have been lighted in the house, and a burning torch held to his side, to relax the integuments, and to render by such means the wound more favourable. The wound had been received the day before; and on pressing the finger upon its orifice the broken end of the arrow could not now be felt, except by the pain which such pressure gave the patient. In the first place, the operator marked with a piece of charcoal the situation and length of the intended incision, which was about two inches; the small wound made by the arrow being in the centre of it. The integuments were now drawn upwards, so that the black line lay upon and parallel with the superior rib; an assistant pressing his hand above, and another below the situation of the intended incision, with a view to keep the integuments firm and steady. The operator having now chosen a fit piece of bamboo, began his incision, and carried it down to the bone, the whole length of the mark, which was done with five or six motions of the hand, aided by considerable pressure. In this part of the operation a shell could not be used, on account of its liability to break. The integuments being now allowed to return to their natural situation, the incision was cautiously continued with a splinter of shell, midway between the two ribs, dividing the intercostal muscles to nearly the same extent as the external wound, to allow of the introduction of a finger and thumb to lay hold of the arrow. During this part of the operation, however, the end of the arrow became perceptible, protruding between the ribs at every inspiration. The operator, as soon as possible, secured it with the finger and thumb of his left hand; while with his right he proceeded to widen the incision on either side, that he might take a deeper and firmer hold, and secure, if possible, the second row of barbs. To facilitate the operation, he now slipped the noose of a string over the barbs he held between his finger and thumb, and having secured which, his left hand was no longer in the way of his right; for by drawing

the string as far as prudence would allow, he kept it pressed upon the superior rib, and thereby preserved the arrow from receding at every expiration. The incision was now carried through the intercostal muscles and the pleura, sufficiently to allow of the introduction of the finger and thumb of the right hand, with which he endeavoured to disengage as much as possible what might obstruct the barbs; while with his left finger and thumb he laid hold of the end of the arrow, and kept gently twisting it, always one way, so as to break down those obstructions which could not be removed with the other hand, taking care, however, not to use so much force as might be supposed liable to break the barbs; and in this way, in the course of two or three minutes, he withdrew the arrow, bringing with it a small portion of the substance of the lungs, which could not be disengaged. During this part of the operation the patient was almost insensible; he was held by those about him, to prevent any mischief arising from his struggles, which at times were violent. The operator now carefully examined the arrow, and being satisfied that every barb (of which there were three rows) was entire, he ordered him to be gently turned on the right side, so that the wound was depending; and to make it more completely so, a quantity of ngatu [tapa] was placed under him in two situations, namely under the shoulder, and under the pelvis, in such a way that the orifice of the wound was evidently the most depending portion of the thorax. The patient being now perfectly sensible, the operator desired him to make a full inspiration, enquiring whether it gave him much pain; and being answered that he could bear it tolerably well, he desired him to make several full inspirations from time to time, but not so as to fatigue himself, and occasionally to move his body gently. By these means a considerable quantity of blood was discharged. A few hours afterwards the operator introduced between the ribs a portion of banana leaf, smoothly folded several times, and anointed with coconut oil, as a pledget to keep open the wound. He ordered his patient to be kept perfectly quiet, not to be spoken to, no noise to be made, nor his attention to be attracted in any way: to live chiefly upon vegetable diet, or if he had any kind of meat, fowl in preference to pork, or if pork, it was to be very small in quantity, and without the least fat, with coconut milk for drink, in any quantity that he felt disposed to take. The first night he had a great deal of pain, much thirst, and little sleep; the following day he was much easier, a great deal of blood was found to have been discharged, and a fresh pledget was introduced, which was renewed every morning as long as any discharge was apparent. When the discharge of sanguinous fluid ceased, which was in about nine or ten days, the operator introduced his probe, to be sure that the cessation of the discharge was not occasioned by any obstruction. He then contented himself with a more superficial pledget, that the external orifice

might not heal too soon; and the patient was allowed to change his posture occasionally, but not for a long time together. As he grew better a little more meat was allowed him; but the use of kava was interdicted until he got tolerably well. The wound healed in about six weeks, without any sort of dressing or washing; the patient was confined to his house about two months, and was not perfectly recovered till near a twelve-month, when he seemed as healthy and as strong as ever, with scarcely any cough having supervened in the meanwhile. This was considered a very dangerous wound, and a very well conducted cure. I do not know that they are acquainted either with the exact situation or existence of the intercostal arteries."

"It often happens that the arrow, not being a barbed one, is withdrawn without any difficulty; but still the surgeon thinks proper to perform the operation of *kauso*, not by enlarging the wound made by the arrow, but by making another at some little distance from it, in a part which, either from judgment or education, he deems more safe and proper. In all those persons whom I knew to have undergone the *kauso* it had been performed in nearly the same situation as the one above stated."

In all cases of considerable wounds produced by pointed instruments the patient is not allowed to wash himself till he is tolerably well recovered, nor to shave, cut his hair, nor his nails. All these things they say are liable to produce *kita* (tetanus), unless the wound be of such a nature, and in such a situation, that it may with safety be first laid completely open, then there is no danger. I never witnessed a case of tetanus produced by these means. They notice that wounds in the extremities, particularly in the feet and hands, are liable to produce tetanus."

Fractures and Dislocations

"As to fractures, and dislocations of the extremities, it may be said that there is scarcely any native but what understands how to manage at least those that are most likely to happen; for they are very well acquainted with the general forms of the bones, and articulations of the extremities. They use splints made of a certain part of the coconut tree. For broken arms they use slings of tapa. In fractures of the cranium they allow nature to take her course without interfering, and it is truly astonishing what injuries of this kind they will bear without fatal consequences. There was one man whose skull had been so beaten in, in two or three places, by the blows of a club, that his head had an odd misshapen appearance, and yet this man had very good health, except when he happened to take kava, which produced a temporary insanity. Fractures of the clavicle and ribs I never saw."

Circumcision

"*Tefe*, or the operation of circumcision, is thus per-

formed. A narrow slip of wood, of a convenient size, being wrapped round with tapa, is introduced under the prepuce, along the back of which a longitudinal incision is then made to the extent of about half an inch, either with bamboo or shell (the latter is preferred); this incision is carried through the outer fold, and the beginning of the inner fold, the remainder of the latter being afterwards torn open with the fingers. The end of the penis is then wrapped up in the leaf of a tree called, *ngatae*, and is secured with a bandage. The boy is not allowed to bathe for three days. The leaf is renewed once or twice a day. At the Fiji Islands this operation is performed by amputating a portion of the prepuce, similar to the Jewish rite."

Amputation of Testicles and/or scrotum

"The natives of these islands are very subject to enlarged testicles, and for this they sometimes perform the operation of *poka* (castration). My limited observation on this subject does not authorize me to speak with any degree of certainty in regard to the precise nature of these tumefactions. [Probably filarial infection leading to elephantiasis]"

"Their mode of performing this operation is summary enough; a bandage being tied with some degree of firmness round the upper part of the scrotum, so as to steady the diseased mass, at the same time that the scrotum is closely expanded over it, an incision is made with bamboo, just large enough to allow the testicle to pass, which being separated from its cellular connections, the cord is divided, and thus ends the operation. They neither tie the cord, nor take any pains to stop the bleeding; but, if the testicle be not very large, and the epididymis not apparently diseased, they perform the operation by dissecting it from that body with the same instrument. The external wound is kept from closing by a pledget of the banana leaf, which is renewed every day till the discharge has ceased, and the scrotum is supported by a bandage. A profuse hemorrhage is mostly the consequence of this operation. It was performed seven times within the sphere of my knowledge, during my stay; three of which I was a witness. Not one of the seven died."

"There was one rare instance of a man, both of whose testes were affected with species of sarcoma, to a degree almost beyond credit. When he stood up, his feet were necessarily separated to the distance of three quarters of a yard, and the loaded scrotum, or rather the morbid mass, reached to within six inches of the ground. There was no appearance of a penis, the urine being discharged from a small orifice about the middle of the tumor, that is to say, about a foot and a half below the *os pubis*. The man's general health was not bad; and he could even walk by the help of a stick, without having any sling or support for his burthen. It was specifically lighter than fresh water, and

considerably lighter than salt water, so as to produce much inconvenience to him when he bathed. He died at the island of Foa, about two or three months before I left Vavau."

Gunshot wounds

"In cases of gunshot wounds, their main object is to lay the wound open, if it can be done with safety in respect to the larger blood-vessels and tendons, not only for the extraction of the ball, if it should still remain, but for the purpose of converting a fistulous into an open wound, that it may thereby heal sooner and better. If they have to cut down near larger vessels, they use bamboo in preference to the shell; the same near tendons, that there may be less chance of injuring them. They always make incisions nearly in the course of the muscles, or, at least, parallel with the limb."

Sprains

"In cases of sprains, the affected part is rubbed with a mixture of oil and water, the friction being always continued in one direction, that is to say, from the smaller towards the larger branches of the vessels. Friction, with the dry hand, is also often used in similar and other cases, for the purpose of relieving pain."

Tetanus

"*Kita* is a disease very common among the Tonga people; but still more common among the natives of the Fiji Islands, who, from their warlike habits, are more frequently in the way of it. They adopt, however, a remedy which the Tonga people have borrowed of them, and consists in the operation of *tokolosi*, or passing a reed first wetted with saliva into the urethra, so as to occasion a considerable irritation, and discharge of blood; and if the general spasm is very violent, they make a seton of this passage, by passing down a double thread, looped over the end of the reed, and when it is felt in the perineum they cut down upon it, seize hold of the thread, and withdraw the reed, so that the two ends of the thread hang from the orifice of the urethra, and the doubled part from the artificial opening in the perineum; the thread is occasionally drawn backwards and forwards, which excites very great pain, and abundant discharge of blood. The latter operation I saw performed several times; but only twice for tetanus, arising in both instances from wounds in the foot. In these cases the spasms, but particularly the convulsive paroxysms, were exceedingly violent, extending to the whole body, neck, face, trunk, and extremities. In neither case was the jaw permanently locked, though on every accession it was violently closed for a few seconds. A native of the Fiji Islands performed one operation, and Halaapiapi the other. They both happened at Vavau, at different times. In either case the disease came on suddenly, three or four days after the wound was received, which was from an

arrow not barbed. The moment the symptoms became evident *tokolosi* was performed. In the short space of two hours one of them was greatly relieved, and the other in about six or eight hours. The following day the one on whom Halaapiapi operated was quite well, and afterwards had no other attack; consequently the thread was withdrawn. The other on the second day was not quite free from spasmodic symptoms, and a paroxysm coming on, the seton was moved frequently, which in two or three hours gave him great relief, and he afterwards had no other attack. It was thought prudent, however, to keep in the seton till the fourth of fifth day, when it was withdrawn. The effect of this operation was a considerable pain and tumefaction of the penis, but which gradually subsided (in about five or six days). The artificial openings in both case healed spontaneously, without difficulty."

"These are the only two cases of tetanus in which this operation was performed that I can speak of with certainty, having been an eyewitness of them. I heard of several others at the Haapai islands, and at the island of Tongatapu, some of which were equally fortunate. From what I have heard and seen of the success of this operation at the Tonga Islands, I am disposed to believe that about three or four in ten recover by the aid of it. The Fiji islanders, however, speak of the happy effects of this singular mode of cure with much more confidence than the natives of Tonga; but as they claim the merit of the discovery, they are probably rather too profuse in praise of it. Tetanus is not the only disease for the cure of which the operation of *tokolosi* is performed. It is adopted also in cases of wounds in the abdomen, upon the mistaken notion that any extravasated blood in the cavity of the abdomen is capable of passing off by the discharge from the urethra. I saw the operation performed once in this case, and, as the man was considered in a very bad state, and notwithstanding got well, the cure was attributed to this remedy. It is also performed for relief in cases of general languor and inactivity of the system; but, in such instances, they only endeavour to produce irritation by passing the reed without any thread or artificial opening. The present King had it thus performed on him for this purpose; and two days afterwards he said he felt himself quite light, and full of spirits."

References

1. Martin, John. *An Account of The Natives of The Tonga Islands*, London 1817.
2. Dale, Paul W. *The Tonga Book*. Minerva Press, London, 1996.

* *Instead of the phonetic spelling of Tongan words devised by Mariner, the author has introduced contemporary Tongan spelling.*